Integrating, $\log\frac{px}{\sqrt{(1+p^2)}}=C=\log a$, say......(3).

This gives $p=\frac{dy}{dx}=\frac{a}{\sqrt{(x^2-a^2)}}$......(4).

Integrating (4), $y=a\log[x+\sqrt{(x^2-a^2)}]+C'$......(5).

Let $y=0$, when $x=b$; then $C'=-a\log[b+\sqrt{(b^2-a^2)}$, and (5) becomes after putting $c=b+\sqrt{(b^2-a^2)}$,

$$\frac{2x}{a}=\frac{c}{a}e^{y/a}+\frac{a}{c}e^{-(y/a)}......(6),$$

e being the Naperian base.

Also solved by *G. B. M. ZERR* and *L. C. WALKER*.

106. Proposed by J. W. YOUNG, Oliver Graduate Student in Mathematics, Cornell University, Ithaca, N. Y.

Prove that $\frac{(2m)!}{(m!)^2}$ is an integer; and more generally that $\frac{(nm)!}{(m!)^n}$ is an integer; m, n being any positive integers.

Solution by G. B. M. ZERR, A. M., Ph. D., The Temple College, Philadelphia, Pa.; and L. C. WALKER, A. M., Professor of Mathematics, Petaluma High School, Petaluma, Cal.

It has been demonstrated that the product of any n successive integers is divisible by $n!$

$$\frac{(nm)!}{(m!)^n}\div\frac{[(n-1)m]!}{(m!)^{n-1}}=\frac{(nm)!}{[(n-1)m)!}\cdot\frac{1}{m!}=\frac{(nm)!}{(nm-m)!}\cdot\frac{1}{m!}$$

$$=\frac{nm(nm-1)(nm-2)......\text{to } m \text{ factors}}{m!}=\text{an integer.}$$

$\therefore$ If $\frac{[(n-1)m]!}{(m!)^{n-1}}$ is an integer, so is $\frac{(nm)!}{(m!)^n}$.

But $\frac{m!}{m!}$ is an integer. $\therefore$ $\frac{(2m)!}{(m!)^2}$ is an integer, and so on to $\frac{(nm)!}{(m!)^n}$.

Also solved by *H. S. VANDIVER*.